

CLAIMS

1. A method of rendering a glyph to make the glyph more readable, comprising:  
receiving a glyph associated with a font, the glyph to be rendered at a size and having one or more strokes, including one or more horizontal or vertical strokes;  
5 calculating an initial adjustment value for the glyph;  
determining an offset amount based on the initial adjustment value such that a minimum number of device pixels will be marked by the one or more horizontal or vertical strokes after adjusting the density values of one or more device pixels representing the glyph;  
rendering a high resolution representation of the glyph so that one or more edges of at  
10 least one stroke is offset from a device resolution grid by the offset amount, the high resolution representation representing a set of device pixels each having an initial density value;  
for one or more of the device pixels in the set of device pixels, calculating a length of an edge of a stroke that passes through the device pixel; and  
15 adjusting the density values of the one or more device pixels by a final adjustment value based on the initial adjustment value and the length of an edge of a stroke passing through the device pixel.
2. The method of claim 1, wherein the offset amount is equal to or greater than the initial adjustment value.
- 20 3. The method of claim 1, wherein calculating an initial adjustment value comprises:  
determining a standard stem width for the font;  
calculating a scaled stem width from the standard stem width and the size; and  
determining an initial adjustment value based on the scaled stem width.
4. The method of claim 1, further comprising,  
25 determining a second offset amount, wherein the rendering step comprises rendering the glyph so that edges of the one or more strokes are offset from the device resolution grid in a first direction by the offset amount and offset from the device resolution grid in a second direction by the second offset amount.

5. The method of claim 1, wherein the high resolution representation of the glyph is rendered offset from the device resolution grid in a first direction only.
6. The method of claim 1, wherein the high resolution representation of the glyph is a high resolution bitmap.
- 5 7. The method of claim 6, wherein calculating a length of an edge of a stroke that passes through a device pixel comprises:
  - identifying initial adjustment pixels along the edges of the high resolution bitmap representation of the glyph, the initial adjustment pixels being high resolution pixels representative of the initial adjustment value;
  - 10 wherein the length of the edge of a stroke that passes through a device pixel is a ratio of the number of initial adjustment pixels in a direction to a grid ratio in the corresponding direction.
8. The method of claim 1, wherein the font is a Type 1 font.
9. The method of claim 1, wherein the font is a TrueType font.
- 15 10. A method of rendering a stroke, comprising:
  - receiving a path representing a stroke, the stroke to be rendered at a size;
  - calculating an initial adjustment value for the stroke;
  - determining an offset amount based on the initial adjustment value such that a minimum number of device pixels will be marked by the stroke after adjusting density values
  - 20 of one or more device pixels representing the stroke;
  - rendering a high resolution representation of the stroke so that one or more edges of the stroke is offset from a device resolution grid by the offset amount, the high resolution representation representing a set of device pixels each having an initial density value;
  - for one or more of the device pixels in the set of device pixels, calculating a length of
  - 25 an edge of the stroke that passes through the device pixel; and
  - adjusting the density values of the one or more device pixels by a final adjustment value based on the initial adjustment value and the length of an edge of the stroke passing through the device pixel.

11. A computer program product, tangibly stored on a computer-readable medium, for rendering a glyph to make the glyph more readable, comprising instructions operable to cause a programmable processor to:

- receive a glyph associated with a font, the glyph to be rendered at a size and having
- 5 one or more strokes, including one or more horizontal or vertical strokes;
- calculate an initial adjustment value for the glyph;
- determine an offset amount based on the initial adjustment value such that a minimum number of device pixels will be marked by the one or more horizontal or vertical strokes after adjusting the density values of one or more device pixels representing the glyph;
- 10 render a high resolution representation of the glyph so that one or more edges of at least one stroke is offset from a device resolution grid by the offset amount, the high resolution representation representing a set of device pixels each having an initial density value;
- for one or more of the device pixels in the set of device pixels, calculate a length of
- 15 an edge of a stroke that passes through the device pixel; and
- adjust the density values of the one or more device pixels by a final adjustment value based on the initial adjustment value and the length of an edge of a stroke passing through the device pixel.

12. The computer program product of claim 11, wherein the offset amount is equal to or  
20 greater than the initial adjustment value.

13. The computer program product of claim 11, wherein instructions operable to calculate an initial adjustment value comprise instructions operable to:

- determine a standard stem width for the font;
- calculate a scaled stem width from the standard stem width and the size; and
- 25 determine an initial adjustment value based on the scaled stem width.

14. The computer program product of claim 11, further comprising instructions operable to:

- determine a second offset amount, wherein the rendering step comprises instructions operable to render the glyph so that edges of the one or more strokes are offset from the

device resolution grid in a first direction by the offset amount and offset from the device resolution grid in a second direction by the second offset amount.

15. The computer program product of claim 11, wherein the high resolution representation of the glyph is rendered offset from the device resolution grid in a first  
5 direction only.

16. The computer program product of claim 11, wherein the high resolution representation of the glyph is a high resolution bitmap.

17. The computer program product of claim 16, wherein instructions operable to calculate a length of an edge of a stroke that passes through a device pixel comprise instructions  
10 operable to:

identify initial adjustment pixels along the edges of the high resolution bitmap representation of the glyph, the initial adjustment pixels being high resolution pixels representative of the initial adjustment value;

wherein the length of the edge of a stroke that passes through a device pixel is a ratio  
15 of the number of initial adjustment pixels in a direction to a grid ratio in the corresponding direction.

18. The computer program product of claim 11, wherein the font is a Type 1 font.

19. The computer program product of claim 11, wherein the font is a TrueType font.

20. A computer program product, tangibly stored on a computer-readable medium, for  
20 rendering a stroke, comprising instructions operable to cause a programmable processor to:

receive a path representing a stroke, the stroke to be rendered at a size;

calculate an initial adjustment value for the stroke;

determine an offset amount based on the initial adjustment value such that a minimum number of device pixels will be marked by the stroke after adjusting density values  
25 of one or more device pixels representing the stroke;

render a high resolution representation of the stroke so that one or more edges of the stroke is offset from a device resolution grid by the offset amount, the high resolution representation representing a set of device pixels each having an initial density value;

for one or more of the device pixels in the set of device pixels, calculate a length of

an edge of the stroke that passes through the device pixel; and

adjust the density values of the one or more device pixels by a final adjustment value based on the initial adjustment value and the length of an edge of the stroke passing through the device pixel.

- 5 21. A system for rendering a glyph to make the glyph more readable, comprising:  
means for receiving a glyph associated with a font, the glyph to be rendered at a size  
and having one or more strokes, including one or more horizontal or vertical strokes;  
means for calculating an initial adjustment value for the glyph;  
means for determining an offset amount based on the initial adjustment value such  
10 that a minimum number of device pixels will be marked by the one or more horizontal or  
vertical strokes after adjusting the density values of one or more device pixels representing  
the glyph;  
means for rendering a high resolution representation of the glyph so that one or more  
edges of at least one stroke is offset from a device resolution grid by the offset amount, the  
15 high resolution representation representing a set of device pixels each having an initial  
density value;  
for one or more of the device pixels in the set of device pixels, means for calculating  
a length of an edge of a stroke that passes through the device pixel; and  
means for adjusting the density values of the one or more device pixels by a final  
20 adjustment value based on the initial adjustment value and the length of an edge of a stroke  
passing through the device pixel.

22. The system of claim 21, wherein the offset amount is equal to or greater than the  
initial adjustment value.

23. The system of claim 21, wherein means for calculating an initial adjustment value  
25 comprise means for:  
determining a standard stem width for the font;  
calculating a scaled stem width from the standard stem width and the size; and  
determining an initial adjustment value based on the scaled stem width.

24. The system of claim 21, further comprising,  
30 means for determining a second offset amount, wherein the means for rendering

comprise means for rendering the glyph so that edges of the one or more strokes are offset from the device resolution grid in a first direction by the offset amount and offset from the device resolution grid in a second direction by the second offset amount.

25. The system of claim 21, wherein the high resolution representation of the glyph is rendered offset from the device resolution grid in a first direction only.

26. The system of claim 21, wherein the high resolution representation of the glyph is a high resolution bitmap.

27. The system of claim 26, wherein the means for calculating a length of an edge of a stroke that passes through a device pixel comprise means for:

10 identifying initial adjustment pixels along the edges of the high resolution bitmap representation of the glyph, the initial adjustment pixels being high resolution pixels representative of the initial adjustment value;

wherein the length of the edge of a stroke that passes through a device pixel is a ratio of the number of initial adjustment pixels in a direction to a grid ratio in the corresponding direction.

28. The system of claim 21, wherein the font is a Type 1 font.

29. The system of claim 21, wherein the font is a TrueType font.

30. A system for rendering a stroke, comprising:  
means for receiving a path representing a stroke, the stroke to be rendered at a size;  
20 means for calculating an initial adjustment value for the stroke;  
means for determining an offset amount based on the initial adjustment value such that a minimum number of device pixels will be marked by the stroke after adjusting density values of one or more device pixels representing the stroke;

means for rendering a high resolution representation of the stroke so that one or more edges of the stroke is offset from a device resolution grid by the offset amount, the high resolution representation representing a set of device pixels each having an initial density value;

for one or more of the device pixels in the set of device pixels, means for calculating a length of an edge of the stroke that passes through the device pixel; and

means for adjusting the density values of the one or more device pixels by a final adjustment value based on the initial adjustment value and the length of an edge of the stroke passing through the device pixel.